



# Rotoiti Nature Recovery Project

Strategic Plan 2014–2019

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All photographs in this report were taken by Gareth Rapley.

Cover image: St Arnaud Range from Kerr Bay.

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# Vision

Restore, learn, be involved—*Whakahokia, ākona, whakauru*

As a result of lessons learnt and shared, New Zealanders value and become involved in restoring the *mauri* (life force) of our ecosystems

## 1. Background

The Department of Conservation (DOC) established five mainland ecological restoration projects ('mainland islands') in the 1995/96 financial year and a sixth at Lake Rotoiti, Nelson Lakes National Park, in the 1996/97 year. These mainland islands were set up with ecological restoration goals, intensive multi-pest control programmes and detailed monitoring. The likely driving force behind their creation was success in species recovery on the New Zealand mainland (e.g. North Island kōkako *Callaeas cinerea wilsoni* at Mapara, in the King Country), alongside calls for ecosystem management and protection of species on the mainland as well as on islands (Saunders 2000). The selection criteria for mainland islands were strongly weighted towards threatened species recovery rather than ecosystem restoration, probably due to the inherent complexity of ecosystems and the difficulty in setting ecosystem restoration goals (Saunders 2000).

There are four North Island mainland island sites:

- Trounson Kauri Park is a 450-ha kauri (*Agathis australis*)-podocarp forest, within which management has focussed on testing pest control tools that have a measurable benefit to North Island brown kiwi (*Apteryx mantelli*) and kūkupa (kererū, *Hemiphaga novaeseelandiae*).
- Northern Te Urewera is a mixed rimu (*Dacrydium cupressinum*)-tawa (*Beilschmiedia tawa*) forest within Te Urewera National Park. The project has five core management areas totalling 1400 ha, which lie within a 4500-ha stoat (*Mustela erminea*) control area and a 47 500-ha possum (*Trichosurus vulpecula*) control area. Management has focussed on testing pest control tools that have a measurable benefit to North Island kōkako, whio (*Hymenolaimus malacorhynchus*) and red mistletoe (*Peraxilla tetrapetala*).
- Boundary Stream is 800 ha of mixed tawa-podocarp-broadleaf and beech forest surrounded by farmland. The core area lies within an 1800-ha mustelid and cat (*Felis catus*) control area. Management has focussed on applying pest control, measuring benefits to yellow-flowered and green mistletoe (*Alepis flavida* and *Tupeia Antarctica*), kererū and wētā, and reintroducing North Island robins (*Petroica longipes*), North Island Brown kiwi and North Island kōkako.
- Paengaroa Reserve is a 117-ha podocarp-broadleaf forest that contains a large number of threatened plants. Possum control has been the main management action within this area, which has had a measured benefit to mistletoe. Weed control has also been an important activity at Paengaroa.

There are two South Island mainland island sites:

- Hurunui is a 6000-ha beech forest that lies in a steep-sided alpine valley. Ship rat (*Rattus rattus*) and stoat control have been applied here in an attempt to retain mohua (yellowhead, *Mohoua ochrocephala*) and orange-fronted parakeets (*Aratinga canicularis*).
- Lake Rotoiti is predominantly mixed honeydew beech forest, but also contains other forest, shrubland, alpine grassland and wetlands centred on the slopes of the St Arnaud Range in Nelson Lakes National Park. The original 825-ha treatment area of the Rotoiti Nature Recovery Project (RNRP) was extended to 5000 ha in 2002 to include more of the St Arnaud Range and part of Big Bush Conservation Area. Black Valley wetland came under management of the RNRP in 2011. A 1500-ha non-treatment area is also designated at the head of Lake Rotoroa.

Unfortunately, the aim of ecological restoration has not yet been realised at a community or ecosystem level at any of the mainland islands, and none of the mainland island projects have attempted to recover the structure and function of complex ecosystems. At these mainland islands, translocations of several species, including robin, kōkako, pāteke (*Anas chlorotis*) and tieke (*Philesturnus carunculatus*) have failed, pests have not always been successfully controlled, and some threatened species (such as mohua and orange-fronted parakeet) have declined in abundance.

However, in the 16 years of operation of the RNRP there have been many highlights, including:

- Substantially increasing the area of pest control whilst developing and improving management prescriptions and tools for controlling wasps (*Vespula* spp.), stoats (*Mustela erminea*), possums (*Trichosurus vulpecula*) and rats (*Rattus* spp.)
- Prescriptions for the recovery of kākā (*Nestor meridionalis*)
- Translocation of great spotted kiwi (*Apteryx haastii*), and improvement in knowledge of Operation Nest Egg™ techniques and the behavioural ecology of this species
- Significant recovery of mistletoe and populations of some small forest birds
- Enhanced public experience, and increased participation by the Friends of Rotoiti (FOR) and the Kea Conservation Trust
- Selection by the Global Restoration Network (a project of the Society for Ecological Restoration International) and Ecological Management and Restoration (a science publication of the Ecological Society of Australia) as one of the Top 25 Restoration Sites in Australasia

Furthermore, pest management at mainland island sites has led to some increases in the abundance of plants, invertebrates and birds, and the health of plants. Other positive outcomes include increased knowledge regarding bird translocation and predator management techniques and tools, and increased public awareness and involvement, as well as the growth of partnerships with community groups, trusts and businesses. DOC mainland islands have also provided information and techniques that have been applied in many community-based restoration projects and DOC kiwi zones.

In an attempt to resolve the tension between ecological restoration (e.g. species recovery and translocations) and other mainland island objectives (e.g. testing new tools), eight ‘mainland island strategic principles’ were adopted in 2005.

## 2. National mainland island strategic principles

Eight mainland island strategic principles were approved by John Cumberpatch, General Manager—Southern Region, in August 2005 and circulated in a memo entitled ‘Strategic Directions for Mainland Islands’. These are listed below:

1. Site-based natural heritage management, with a primary focus on learning how to carry out ecological restoration. This is achieved by addressing management questions through rigorous trials and experiments, combined with intensive monitoring and evaluation that follows standardised systems and processes.
2. Results and outcomes are communicated.
3. Sites where research and learning outcomes take precedence over biodiversity outcomes.
4. Sites that contain a number of specific projects, as a secondary objective, aimed at restoring biodiversity through intensive management.
5. Sites that provide boundaries that can be protected.
6. Systems required to manage sites are sustainable.
7. Sites that provide opportunities for community involvement, and inspire people to support biodiversity recovery and ecological restoration.
8. Sites that inspire people to initiate and develop additional restoration projects elsewhere.



*St Amand from the air.*

### 3. Rotoiti Nature Recovery Project guiding principles

The following guiding principles have been developed to provide a clear *modus operandi* for the RNRP. These principles restate the essence of the eight national mainland island strategic principles, acknowledge the tension between learning and retaining existing populations of native species, and emphasise what mainland islands need to do well to achieve their mandate.

#### 1. Learn how to carry out ecological restoration while retaining the biodiversity gains achieved

It can take considerable effort to restore viable populations of species through the application of specific tools and prescriptions. The abandonment of such populations once the experiment is completed is undesirable for a number of reasons, including the need to maintain public support for mainland island projects. Likewise, the testing of new tools can be confounded when carried out in the presence of intensive management regimes that are aimed at retaining biodiversity. The eight principles outlined in section 2 clearly state the importance of ‘learning how to carry out ecological restoration’, but also recognise the importance of ‘specific projects aimed at restoring biodiversity through intensive management’.



Tomtit, *Petroica macrocephala*.

#### 2. No species should be allowed to go locally extinct

Species are declining and, in some cases, going locally extinct at unmanaged sites on the New Zealand mainland. Learning how to carry out ecological restoration to reverse such declines can involve the application of treatments that benefit some species but not others. For example, stoat control to protect kākā can result in increased rat abundance, which can have a negative impact on robins. Therefore, although robins could disappear from the treatment area in the short term, they should not be allowed to go locally extinct within the local population range; and in the long term, robins should be able to re-establish within the treatment area either naturally or with assistance.

#### 3. Use applied science to learn

Obtaining reliable knowledge is dependent on asking meaningful questions in the right order and testing these using robust study designs. The Science and Technical Unit of the Science and Capability Group (DOC) and the Technical Advisory Group for the RNRP can help formulate questions, while DOC’s Field Trial for Animal Pest Operations Standard Operating Procedure (Anon 2013) provides a useful tool to ensure that a robust study design is used. The non-treatment block at the head of Lake Rotoroa provides

confidence that any effects measured at the treatment sites are real. Furthermore, strong peer review by both advisory groups will ensure that the results are correctly interpreted.

#### 4. Share lessons learnt

Lessons learnt at the RNRP have value for other intensively managed sites nationally (e.g. kiwi zone sites and private restoration projects). The New Zealand public is also more likely to support biodiversity management if it understands the issues and what is being achieved. These different audiences require different types of knowledge transfer—quality reports, scientific publications and opportunities to experience restoration at Lake Rotoiti.



Mistletoe monitoring.



## 4. Rotoiti Nature Recovery Project goal

The original goal of the RNRP was 'Restoration of a beech forest community with emphasis on the honeydew cycle' (Butler 1998). This goal was then changed in the last plan (Brown & Gasson 2008) to refocus management on restoring species through intensive pest management and translocation, testing specific wasp and vertebrate pest control tools, and public education. By the end of 2013, DOC had undergone a change in strategic direction that brought with it an increased focus on fostering partnerships to grow conservation goals. Consequently, the public support goal has been broadened to not only increase public support, but also to foster partnerships to increase conservation achievements.

The goal stated below recognises the need for the RNRP to attempt to balance the restoration and maintenance of viable populations of species against testing tools and prescriptions to learn how to restore species, whilst acknowledging the importance of community involvement and the need to foster partnerships.

### Goal

**To restore native biodiversity at Lake Rotoiti, increase our knowledge of how to restore biodiversity nationally, increase public support for ecological restoration, and develop and maintain partnerships.**



*Yellow-crowned parakeet, Cyanoramphus auriceps.*

## 5. Rotoiti Nature Recovery Project objectives

The following objectives have been grouped into biodiversity, learning and community objectives, following the 'Strategic Directions for Mainland Islands' memo of 2005. Integration of these three types of objective can be challenging but will be necessary if the RNRP goal is to be achieved.

### Biodiversity objectives

1. **Restore and maintain populations of kea (*Nestor notabilis*), kākā, mistletoe, *Pittosporum patulum* and a *Powelliphanta* snail**

This objective is linked to mainland island strategic principle 4. Kea, kākā, mistletoe, *Pittosporum patulum* and *Powelliphanta* "Nelson Lakes" were present at Rotoiti prior to the establishment of the RNRP. Considerable management effort has been expended to restore these species (except kea) to date, and the maintenance of viable populations will require the ongoing control of possums and stoats. Kea are now being included as they form an integral part of the South Island alpine ecosystem. However, such ongoing pest management could compromise future learning opportunities and, in turn, the testing of different pest management tools and prescriptions could compromise the above biodiversity. Therefore, this tension between biodiversity and learning objectives requires that future trials are thoroughly discussed and well designed. The above species are indicators of the effectiveness of management as well as being worth retaining in their own right. The indicator species used to test different management regimes will likely change through time.



Scarlet mistletoe, *Peraxilla colensoi*.

2. **Establish and maintain populations of whio, great spotted kiwi, rock wren (*Xenicus gilviventris*) and other native species**

This objective is also linked to mainland island strategic principle 4. The introduction and establishment of viable populations of species is a recognised ecological restoration technique that provides learning opportunities. However, it can potentially limit future pest control learning opportunities. For example, the translocation of a species that requires large-scale rat control to maintain a viable population could significantly compromise the testing of rat control tools and prescriptions. Therefore, all future translocations should be considered very carefully in terms of the rationale, likelihood of success and potential impact on future learning opportunities. Great spotted kiwi have been being introduced since 2004, and breeding has occurred so that the population is becoming viable and, in the process, we have also learnt about great spotted kiwi behavioural ecology. Large-scale pest control has been carried out in the nearby Mt Owen area to benefit whio; however, there are currently few sites in which dispersing young can establish safely. Similarly, rock wrens were present at Nelson Lakes and now only a small disjunct remnant population exists. Therefore, pest control in the Travers/Sabine area is recommended to provide for this need.



South Island robin, *Petroica australis australis*.

## Learning objectives

### 3. Test the effectiveness of control methods for stoats, rats, cats, possums, wasps and other potential pest species in a beech forest and alpine ecosystem

This objective is linked to mainland island strategic principle 1. In the past 5 years, a substantial amount of research has been carried out on new traps, poisons and control techniques, and the RNRP is an ideal site for testing these (as is currently occurring with the A24 self-resetting stoat trap). In some cases, techniques need to be adjusted and protocols developed to afford specific nest protection and thus improve the breeding success of birds (e.g. kea). For the RNRP, the identification of rodent control prescriptions that work for bait stations is essential for ecological restoration of beech forest systems during beech mast and non-mast years.



Stoat, *Mustela erminea*, trapped with an A24 trap.

### 4. Maintain long-term datasets on bird abundance and forest health in response to ongoing management and predator population cycles

This objective is linked to mainland island strategic principle 1. Robust long-term measures of bird abundance and breeding success along with forest health can indicate the benefits of ongoing intensive management at Lake Rotoiti. The RNRP datasets



Vegetation plot monitoring.

are becoming very important components of the work and can be used to determine the responses of the ecosystem to pest control. As data continue to be added to the 14+ years of information already gathered, these will become increasingly valuable at a national and international scale, and comparisons can also potentially be made with other sites nationally. Long-term monitoring is independent of the short-term intensive monitoring that is linked to testing tools and prescriptions, and the medium-term monitoring to ensure that restored species have established viable populations. Standardised monitoring tools have been developed and applied to enable comparisons with other sites nationally, and have provided information to inform long-term ecological studies of national and international importance.

### 5. Record observations of previously unreported native and non-native species in the RNRP area

This objective is not linked to any specific mainland island strategic principle, but is included with the intention of maximising what can be learnt from observations of species previously not known to be present, regardless of whether or not the observation is made during an organised survey. Increased knowledge of the native species that are present in RNRP is useful; and detection of invasive plants or animals would inform management actions to protect biodiversity values in the mainland island. The results of planned surveys and any isolated observations should be recorded in the appropriate national and local databases.

**6. Facilitate research to improve our understanding of the ecology and management of beech forest, alpine and wetland ecosystems**

This objective is most closely linked to mainland island strategic principle 1. Research should be managed to ensure that rigorous trials and experiments are combined with intensive monitoring. External agencies and individuals continue to carry out valuable research at the mainland island, and have used the increasingly important long-term datasets of the RNRP. However, proposed research has not always been carried out. The integration of research designs that address meaningful questions into an environment of intensive management, monitoring and testing of tools will need to be managed with care. Increasingly, organisations such as Landcare Research—Manaaki Whenua, the University of Otago and Victoria University of Wellington are seeing the value of the mainland island to support their research. The recent inclusion of the Black Valley wetland under the aegis of the RNRP requires that the needs of wetlands be included within the research objective.

**7. Analyse and report on the effectiveness of management techniques, and ensure that knowledge gained is transferred to the appropriate audiences to maximise conservation gain**

This objective is linked to mainland island strategic principle 2, and to guiding principles 3 and 4. Progress on all of the previous objectives has little value if reporting is not completed to inform other conservation practitioners. The importance of this applies equally to external research as well as the core work of the RNRP team.

## Community objectives

**8. Foster relationships with likely partners to produce conservation gains within both the mainland island and the local area**

This objective is linked to mainland island strategic principles 1, 4, 7 and 8. The RNRP can lead the way on encouraging partnerships to increase conservation gain by fostering the current successful relationships with FOR, local iwi and volunteers. Recent new partnerships with groups and businesses such as the Kea Conservation Trust will provide future direction, support and resources for improving conservation outcomes at the mainland island.

**9. Increase public knowledge, understanding and support for mainland islands and ecological restoration nationally through education, experience and participation**

This objective is linked to mainland island strategic principles 7 and 8. Native biodiversity is in decline and at greatest risk on the New Zealand mainland. Resources for ecological restoration are limited and large knowledge gaps remain. The restoration of native biodiversity is dependent on ongoing and increased public support, and the development of relationships to ensure that adequate national resources are allocated to ecological restoration on the mainland. Such support can be obtained by having a well-informed public that values native biodiversity and understands the role of mainland islands, and by fostering the growing relationships with FOR and local iwi.



*Unknown fungus.*



*Beech strawberry, Cyttaria sp.*



*King's pouch, Cortinarius porphyroideus.*

## 6. RNRP relationships

**Nelson Lakes Area**—The RNRP is a significant part of the Nelson Lakes Area biodiversity programme. The success of RNRP is dependent on integration with all other Area work programmes.

**RNRP Technical Advisory Group (TAG)**—Provides North and Western South Island Regions decision-making support and review of all aspects (planning, implementation, reporting and review) of the project.

**Partnership managers**—Jan Hania (Director, Conservation Partnerships, North & Western South Island Region), Martin Rodd (Conservation Partnerships Manager—Nelson) and David Hayes (Conservation Partnerships Manager—Marlborough).

**Science and Capability Group and Biodiversity Planners**—Provide technical direction through the Natural Heritage Management System (NHMS) managed sites programme and Inventory & Monitoring Toolkit.

**Iwi**—Ngāti apa are included in relevant consultation with regard to higher level planning and when required on a specific piece of work, e.g. translocations, Operation Nest Egg™, wasp toxin operations.

**Friends of Rotoiti (FOR)**—A DOC-led group of volunteers that carries out pest control in areas contiguous with the mainland island in a manner that is complementary to core RNRP work.

**Other mainland islands, sanctuaries and kiwi sanctuaries**—Information transfer with other intensively managed sites nationally.



*A24 trap set above the bushline in the St Arnaud Range.*



*Lacebark, Hoheria lyallii.*



*Hooded orchid, Pterostylis sp.*



*St Arnaud Range gentian, Gentianella sp.*

## 7. References

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## 8. Glossary

**Beech mast**—When native beech trees produce a particularly heavy seed crop that drives a rapid increase in rat and stoat numbers.

**Ākōna**—To learn, teach.

**Kiwi zones**—Five mainland sites where kiwi are to be recovered and maintained.

**Mainland islands**—Six mainland sites where different management prescriptions are being tested to learn how to carry out ecological restoration, biodiversity is protected, and the public are able to view and participate in ecological restoration.

**Mauri**—Spirit, life principle or life force.

**Natural Heritage Management System (NHMS)**—A system that is currently being developed to transform the Department of Conservation's natural heritage management processes into a nationally consistent system that is underpinned by science.

**Science and Capability Group**—The Science and Capability Group of the Department of Conservation, whose role includes providing national coordination of mainland island projects.

**Whakahokia**—To restore, return.

**Whakauru**—To join, be involved with.



*Black beech, Fuscospora solandri, in flower.*